EMERGENCY ACTION PLAN

ISAC CREEK DAM

LITTLE BEAVER CREEK RANCH (LBCR)

HUSON, MT 59846

1/25/2011

IF ISAAC CREEK DAM IS FAILING OR FAILURE SEEMS IMMINENT, CALL:

Missoula County Sheriff	911 or 721-5700 523-4810
Disaster and emergency Services / Frenchtown fire chief	911
Little Beaver Creek Ranch (LBCR) Janette Miner	(owner) 626-4644 or 626-0058
Or	
Gerhard Von der Ruhr	(262) 786 4383 or 532-8222

TABLE OF CONTENTS

I. INTRODUCTION 1

A. Purpose 1

B. Description of Dam 1

C. Access to Dam 1

D. Hazard Area 1

E. Responsibility and Authority 2

F. Periodic Review/Update 2

G. Approval 2

II. NOTIFICATION PROCEDURE

A. Imminent or Actual Failure 3

B. Potentially Hazardous Situation 5

C. Posting of the Notification Flowchart and Distribution of the EAP 8

III. MITIGATION ACTIONS

A. Potential Problems and Immediate Response Actions. . . 9

B. Emergency Supplies and Resources 11

C. Local Contractors and Engineers 11

APPENDIXES

A. Technical Data for Isaac Creek Dam A1

B. Dam Structures B1

C. Map C1

D. Telephone Directory D1

E. Dam Incident Report Form E1

I. INTRODUCTION

A. PURPOSE

The purpose of this Emergency Action Plan (EAP) is primarily to safeguard the lives of and secondarily to reduce property damage to the citizens of Missoula County living along Isaac Creek in the event of flooding caused by a failure of Isaac Creek Dam.

B. DESCRIPTION OF DAM

Isaac Creek Dam is in Missoula County, in the Northwest Quarter (NW 1/4) of Section 9, Township 15 North (T15N), Range 22 West (R22W), and located on Isaac Creek, a tributary to the Ninemile Creek. It is owned by Little Beaver Creek Ranch (LBCR), Box 450, Huson, Montana 59846, and is used for irrigation, stock watering, and recreation purposes. Technical data pertaining to Isaac Creek Dam are listed in Appendix A, and its structures are shown in Appendix B.

C. ACCESS TO DAM

Isaac Creek Dam is located off Sixmile Road, nine miles west of Frenchtown. As shown on the inundation maps in Appendix C, two roads access the Isaac Creek Dam, one from Sixmile Road and one from Remount Road. The nearest telephone is at the LBCR or the Ranger Station.

D. HAZARD AREA

The evacuation area extends along Isaac Creek, as shown in Appendix C. Hazards include the possible inundation of 4 occupied dwellings. Inundation and evacuation maps are in Appendix C.

E. RESPONSIBILITY AND AUTHORITY

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation was defined through coordination of this plan with the County Sheriff and the Disaster and Emergency Services (DES) Coordinator.

F. PERIODIC REVIEW/UPDATE

The owner will review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.

G. APPROVAL

By my signature, I acknowledge that I, or my representative, have reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

Signature Date
MISSOULA COUNTY SHERIFF'S DEPT.

Signature Date
DISASTER AND EMERGENCY SERVICES

II. NOTIFICATION PROCEDURES

A. IMMINENT OR ACTUAL FAILURE

It is important that you accurately judge whether the dam is about to fail. If you aren't sure whether the dam is threatened, seek advice from a qualified engineer or call the Dam Safety Section (444-6603) of the Department of Natural Resources and Conservation (DNRC). If Isaac Creek Dam is failing, two things must be done immediately: (1) the hazard area downstream from the dam must be evacuated, and (2) any steps that might save the dam or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix C to determine the areas that are likely to be inundated if the dam fails). The evacuation will be handled according to the county warning plan, and should be initiated as shown in Figure 1 (page 4).

As dam owner, it is your responsibility to:

1. Call the Sheriff's Dispatch Center (911) and Disaster and Emergency Services (911). Be sure to say, "This is an emergency." They will call other authorities and the media and begin the evacuation.

2. Do whatever is necessary to bring anyone in immediate danger to safety. This includes someone on the dam, directly below the dam, or boating on the reservoir, or evacuees if so directed by the sheriff.

3. Keep in frequent touch with Disaster and Emergency Services staff. They will tell you how to handle the emergency.

Figure 1

Isaac Creek Dam
Actual or Imminent Failure
Notification Flow Chart

Emergency Condition

Observer

Missoula County Sheriff
911

Local DES Coordinator/Frenchtown Fire chief
911

Dam Owner
Little Beaver Creek Ranch: 626 4644
LBCR Manager: Janette Miner 626 0058
Gerhard Von der Ruhr (262) 786 43 83

Evavcuees

Department of Natural Resources & Conservation
Dam Safety Section
Chad Newman **: Office 444 9362**

Michelle Lemieux 459 3572

The phone nearest to the dam is at the Nine Mile Ranger Station

4. If all means of communication are lost:
   a. Try to find out why;
   b. Try to get to another radio or telephone that works;
   c. Get someone else to try to reestablish communications.

If these means fail, handle the immediate problems as well as you can, and periodically try to reestablish contact with Disaster and Emergency Services.

B. POTENTIALLY HAZARDOUS SITUATION

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems, failure of the spillway or outlet works, heavy precipitation or rapid spring snowmelt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2 (page 6).

If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:

1. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.

2. Notify the county Disaster and Emergency Services Coordinator (911) of the potential problem.

Figure 2

Isaac Creek Dam
Potentially Hazardous Situation
Notification Flow Chart

↓

Unusual Occurrence

↓

Observer

↓

Dam Owner
Little Beaver Creek Ranch: 626 4644
LBCR Manager: Janette Miner 626 0058
Gerhard Von der Ruhr (262) 786 43 83

↓

1. **Local Engineer:** FIA office 329 3247
2. **Disaster Emergency Services: 911**
3. **DNRC Dam Safety Section:** 444 6664, , Michelle Lemieux 459 3572

The phone nearest to the dam is at the Nine Mile Ranger Station

3. Contact the Dam Safety Section (444-6603) of the Department of Natural Resources and Conservation.

Among the conditions the dam owner should watch for are:

1. Overtopping of the dam by flood waters.

2. Loss of material from the dam crest due to storm wave erosion.

3. Slides on either the upstream or downstream slope of the embankment as evidenced by:
   a. Sloughing
   b. Cracking
   c. Bulging
   d. Scarping

4. Erosional flows through, beneath, or around the embankment as evidenced by:
   a. Excessive seepage
   b. Discoloration of the seepage
   c. Boils on the downstream side
   d. Sinkholes
   e. Changes in piezometer levels
   f. Changes in the flow from drains

5. Failure of outlets or spillways due to clogging or erosion.

6. Movement of the dam on its foundation as evidenced by:
   a. Misalignment
   b. Settlement
   c. Cracking

7. Loss of abutment support as evidenced by cracking in concrete dams.

When the dam owner calls either an engineer or DNRC to report a problem, use the form in Appendix A to ensure you can provide sufficient information for the engineer to analyze the problems. In addition, prepare a sketch showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take to mitigate the effect of many problems.

C. POSTING OF THE NOTIFICATION FLOWCHART AND DISTRIBUTION OF THE EAP.

The Notification Flowchart is posted at the dam, and a copy of the EAP is at the ranch. The Missoula County Sheriff's Office and the Missoula County DES Coordinator have copies of the plan.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Section (444-9362). Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. POTENTIAL PROBLEMS AND IMMEDIATE RESPONSE ACTIONS

1. OVERTOPPING BY FLOOD WATERS

a. Open outlet to its maximum safe capacity.

b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.

c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.

d. Divert flood waters around the reservoir basin, if possible.

e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.

2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.

b. Lower the water level to an elevation below the damaged area.

3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

   a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.

   b. Stabilize slides on the downstream slope by:

      i. weighting the toe area with additional soil, rock, or gravel, and then

      ii. restoring lost freeboard by placing sandbags at the crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS

   a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).

   b. Lower the water level until the flow decreases to a non-erosive velocity or stops.

   c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.

5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS

   a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.

   b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)

   a. Immediately lower the water level until excessive movement stops.

7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT

   a. Lower the water to a safe level.

   b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION

   a. Reduce the flow over the spillway by fully opening the main outlet.

   b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.

   c. When the inflow subsides, lower the water to a safe level.

9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT

   a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.

   b. If necessary, restore freeboard, preferably by placing sandbags.

10. LOSS OF ABUTMENT SUPPORT OR EXTENSIVE CRACKING IN CONCRETE DAMS

   a. Lower the water level by releasing it through the outlet.

   b. Attempt to block water movement through the dam by placing plastic sheets on the upstream face.

B. EMERGENCY SUPPLIES AND RESOURCES

In the vicinity of Isaac Creek Dam are soils suitable for emergency repairs. The north bank of Ninemile Creek and hillside of Section 17 are composed of a layer of clayey, silty soil that should be fairly impermeable. Within one mile from the reservoir, ballast rock is available on the LBC Ranch.

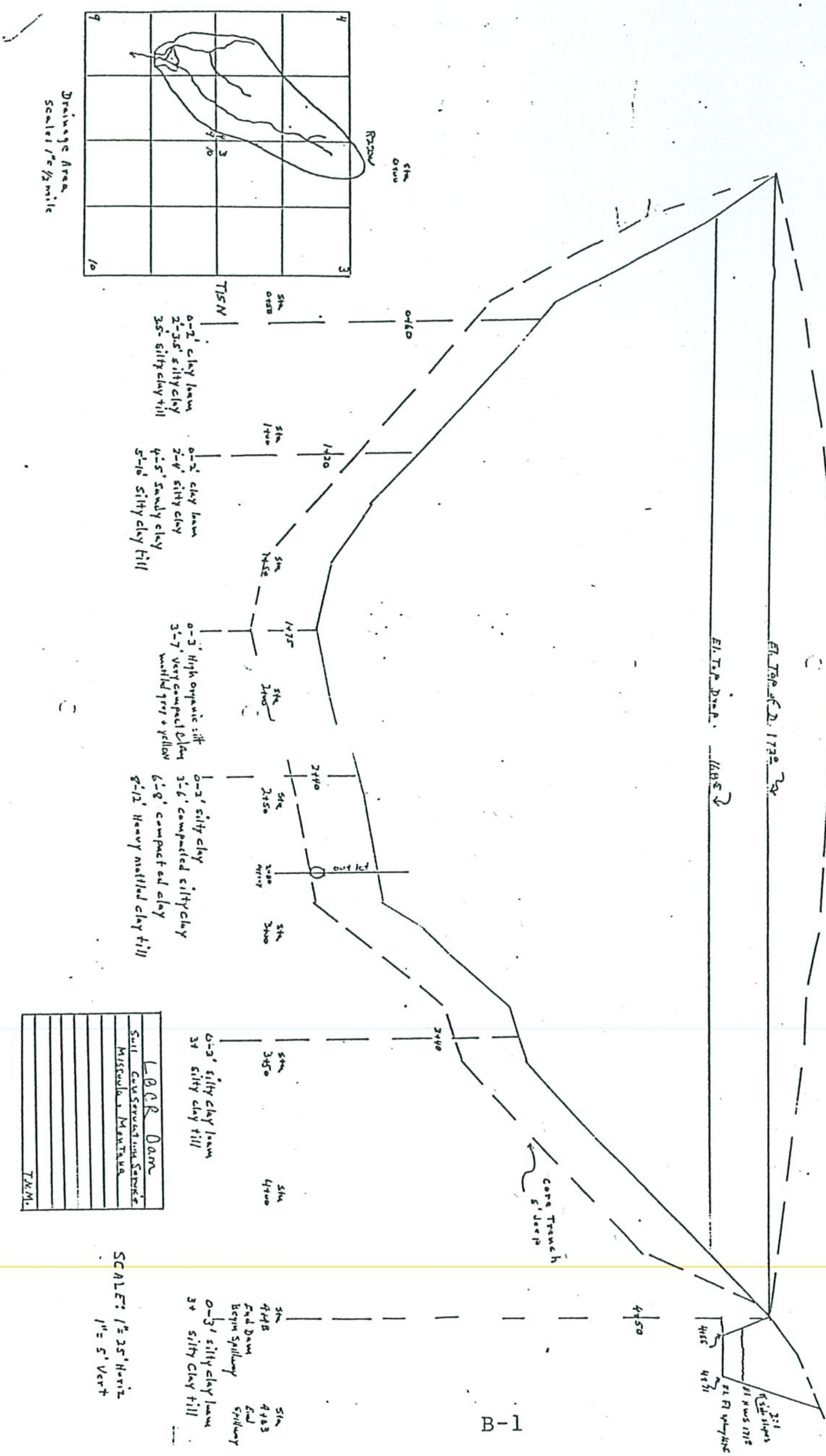
C. LOCAL CONTRACTORS AND ENGINEERS

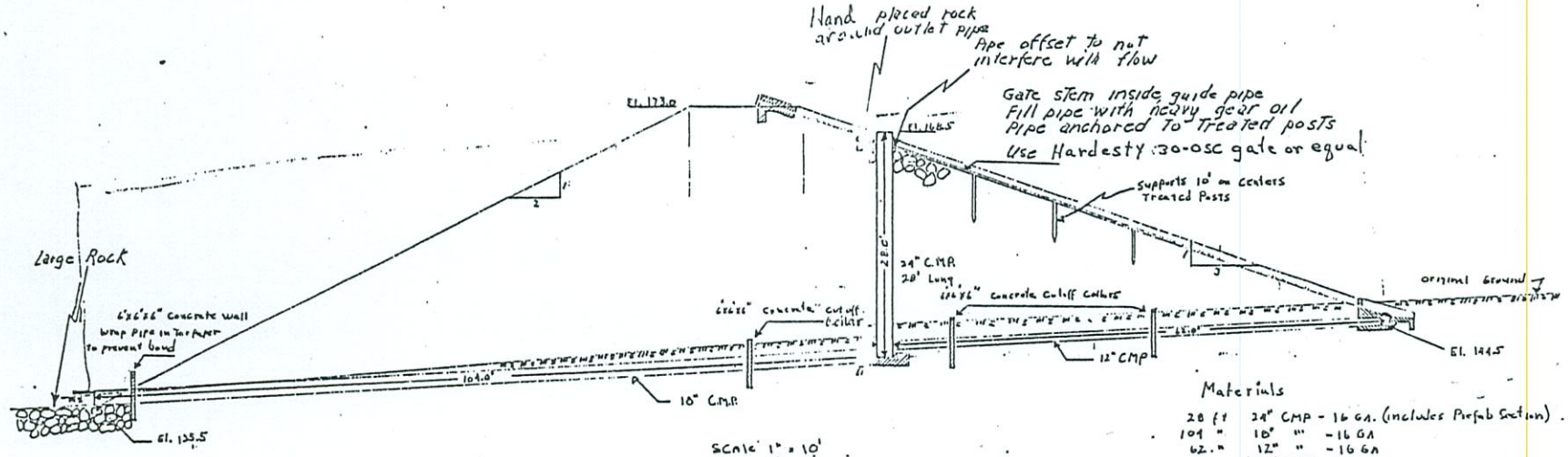
Johnson Brothers 543-5355

APPENDIX A

TECHNICAL DATA FOR ISAAC CREEK DAM

Maximum Reservoir Capacity to the Crest of the Dam	125 acre feet
Normal Reservoir Capacity Measured to the Emergency Spillway Crest	125 acre feet
Normal Water Depth Measured from the Steambed to the Crest of the Emergency Spillway	30 feet
Dam Height Measured from the Steambed to the Crest of the Dam	32 feet
Dam Crest Width	15 feet
Dam Width at Base	166 feet
Length of Dam Crest	180 feet
Date Constructed	1950's
Slope of Upstream Face of Dam (Horizontal to Vertical)	2.2:1
Slope of Downstream Face of Dam (Horizontal to Vertical)	2.8:1

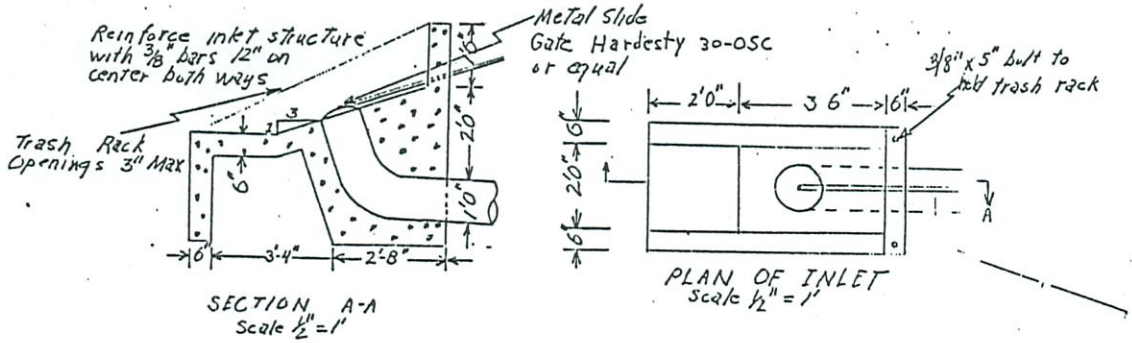

15% for settling
El. Top of D. 173.0
El. Top Drop. 168.5
2:1 R side slopes
El HWS 171.0
El Fl splwy 167.5
4+56
4+71
4+50
Core Trench 5' deep
0+60
1+20
1+75
2+40
outlet
3+40
Sta 0+00
R22W
T15N
Sta 0+50
0-2' clay loam
2'-3.5' silty clay
3.5- silty clay till
Sta 1+00
0-2' clay loam
2'-4' silty clay
4'-5' sandy clay
5'-10' silty clay till
Sta 1+50
Sta 2+00
0-3' High organic silt
3'-7' very compact clay mottled grey + yellow
Sta 2+50
0-3' silty clay
3'-6' compacted silty clay
6'-8' compacted clay
8'-12' Heavy mottled clay till
Sta 3+00
Sta 3+50
0-3' silty clay loam
3+ silty clay till
Sta 4+00
Sta 4+48
End Dam
Begin Spillway
0-3' silty clay loam
3+ silty clay till
Sta 4+83
End Spillway
Drainage Area
Scale: 1" = 1/2 mile
LBCR Dam
Soil Conservation Service
Missoula, Montana
T.N.M.
SCALE: 1" = 25' Horiz
1" = 5' Vert

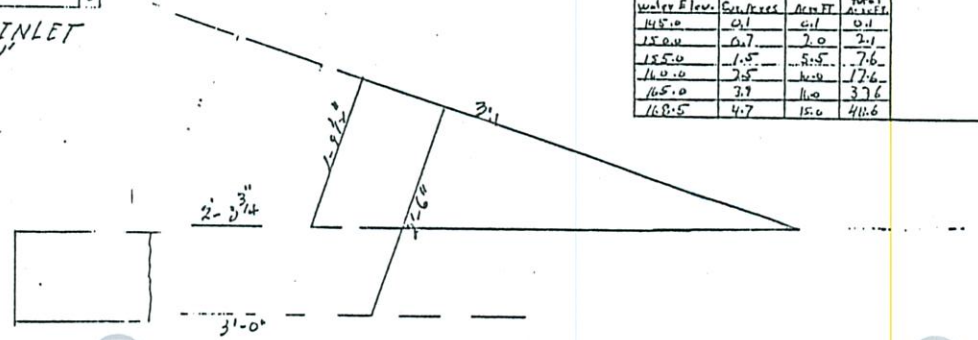


CROSS SECTION OF DAM ON CENTER LINE OF OUTLET

Materials

28 Ft	24" CMP - 16 GA. (includes Prefab Section).
104 "	10" " - 16 GA
62 "	12" " - 16 GA
84 Ft	12" pipe
88 "	gate rod
1 ea.	Hardesty (30-OSC) or equivalent



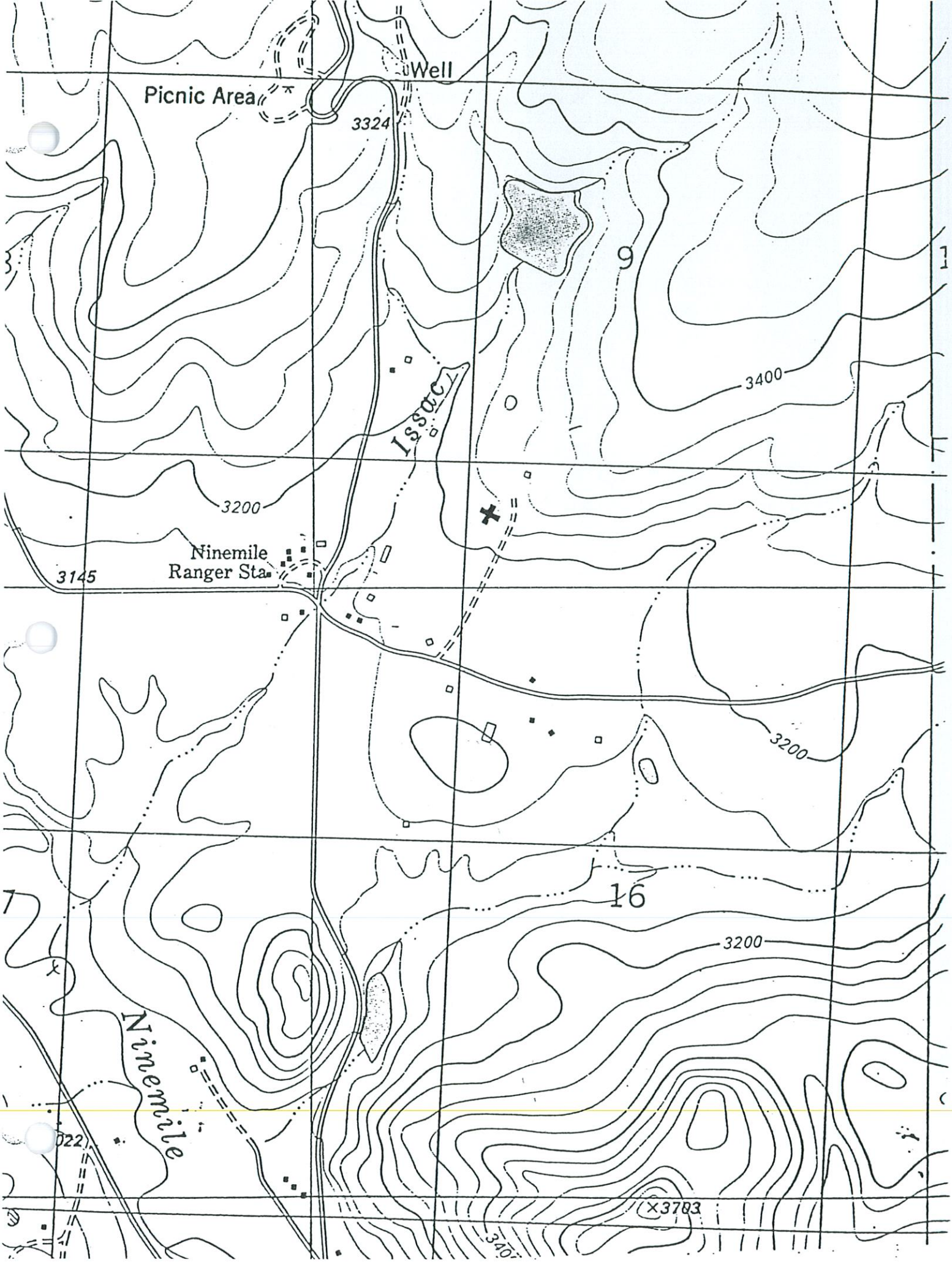


LBCR DAM

NINE MILE - Missoula County

Water Elev.	Cu. Ft./sec.	Acre FT	Total Acre Ft.
145.0	0.1	0.1	0.1
150.0	0.7	2.0	2.1
155.0	1.5	5.5	7.6
160.0	2.5	10.0	17.6
165.0	3.9	11.0	37.6
168.5	4.7	15.0	41.6

L.S.I. TMM 6-1-92


Well
Picnic Area
3324
9
3400
Issac
3200
Ninemile
Ranger Sta
3145
3200
16
3200
Ninemile
X3783

APPENDIX C

PETTY MOUNTAIN 1:24 000
3177 IV NW

SCALE 1:62500

(DIAMOND POINT 1:24 000)
3177 IV NE

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGIN
MISSOULA

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt
U.S. Route

CONTOUR INTERVAL 80 FEET
DOTTED LINES REPRESENT 40 FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MONTANA
QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ALBERTON
N4700—W11
1959
AMS 3178 III—SE

APPENDIX D
TELEPHONE DIRECTORY

A. PRIORITY ONE

1. SHERIFF 911

2. DISASTER and EMERGENCY SERVICES

Missoula County Office 911

3. EVACUEES

House # 2 20240 9 Mile Rd.

House # 3 20265

House # 7 20210

House # 8

All close to the intersection of Remount Rd. and Nine Mile Rd.

B. PRIORITY TWO

1. Local Engineer: 329 3247
2. Montana Department of Natural Resources & Conservation

Dam Safety Section: 444 9362

Michelle Lemieux 459 3572

Dam Safety Engineers:

Mike Oelrich – Soil and Embankments 449 5668

Steve Holnbeck – Spillways and Hydrology

3. National Weather Service in Missoula
4. Bureau of Land Management 657 6561
5. Montana Department of State Lands 444 2074
6. US Forest Service, Nine Mile Ranger Station 626 5201

APPENDIX E

DAM INCIDENT REPORT FORM

DATE_____ TIME_____ A.M. P.M.

NAME OF DAM_____

STREAM NAME_____

LOCATION_____

COUNTY_____

OBSERVER_____

OBSERVER TELEPHONE_____

NATURE OF PROBLEM_____

_____

LOCATION OF PROBLEM AREA_____
(Looking Downstream)

_____

EXTENT OF PROBLEM AREA_____

_____

FLOW QUANTITY AND COLOR_____

_____

WATER LEVEL IN RESERVOIR_____

IS SITUATION WORSENING?_____

EMERGENCY STATUS_____

CURRENT WEATHER CONDITIONS_____

_____

ADDITIONAL COMMENTS_____

_____

_____

_____